MOBILE DEVICE FOR MAPPING SMS CHARACTERS TO B.G. SOUND, VIBRATION, OR GRAPHICAL EFFECTS

Field of the invention

5   The invention relates to a device for perceivably
accentuating message elements of a message, wherein said
message is composed of message elements chosen from a
limited set of message elements, the device comprising:
means for defining and/or altering a set of Selected

10   Message Elements (SMEs) containing at least one SME,
wherein each SME is a message element from said limited
set of message elements; means for assigning a
Perceivable Accentuation Signal (PAS) from a set of PASs
to each of said SMEs in said set of SMEs; means for

15   searching said message for SMEs of said set of SMEs; and
means for generating the assigned PAS for each SME found
in said message. The invention further relates to a
method and a computer program product for the perceivable
accentuation of message elements of a message.

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Background of the invention

The Short Message Service (SMS) is a service for sending
text messages of a limited number of characters to mobile
phones that are for instance operated according to the

25   Global System for Mobile Communication (GSM) standard or
the forthcoming Universal Mobile Telecommunications
(UMTS) standard. SMS is similar to paging. However, SMS
messages do not require the mobile phone to be active and
within range and will be held for a number of days until

30   the phone is active and within range. SMS messages are
transmitted within the same cell or to anyone with
roaming service capability. They can also be sent to
digital phones from a Web site equipped with PC Link or
from one digital phone to another. Typical uses of SMS

35   include notifying a mobile phone owner of a voice-mail

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message, notifying a salesperson of a contact to call,
notifying a doctor of a patient with an emergency
problem, etc.. The SMS messages can be stored on the
mobile phone and are usually presented for reading on the
5   display of the mobile phone.

To enhance the information portrayal of SMS messages on
mobile phones, techniques such as haptic messaging have
been developed. Haptic messaging means SMS-based
10   messaging, where part of the SMS message includes
elements like a smiley, e.g. 8) or ;) or :(, that
associate vibration at the receiving mobile phone.

Haptic actuators are known from PC and console game
15   controls, e.g. as force feed-back. Further application
fields are vehicle controls, surgical telemanipulators,
aircraft controls (stall alert on control stick/wheel)
and cars, e.g. the BMW iDrive in the 700-series. Haptic
actuation is thus a well established technique in human-
20   machine interaction, which, with further decreasing
actuator sizes, also becomes applicable for handheld
consumer products.

It is generally known that special characters, symbols,
25   icons or a smiley can be defined to mark specific
vibration patters that are transferred as text via the
SMS protocol to the receiving mobile phone, where
vibration motors or specific haptic actuators are used to
create vibrations together with the text. This enhances
30   and highlights the SMS message without requiring a new
type of message format, as it is e.g. the case with the
MIDI standard for audio messaging.

However, problems arise when sending haptic content over
the network or otherwise directly between separate
devices is to be implemented. Said direct transmission
means might include a Bluetooth connection, an infrared
5   data link, a cable connection or any other method capable
of similar transmission functionality. Due to different
haptic capabilities of the mobile phones fabricated by
different manufacturers, haptic messaging is hard to
standardise. Standardisation of haptic messaging via SMS
10   would require to prescribe the haptic effects each mobile
phone has to be able to generate as well as to define the
elements (words) of an SMS message that force these
haptic effects at the mobile phone that receives the SMS
message. Factors inhibiting standardisation of haptic
15   messaging are related to the question of how to enter and
manage haptic data at the transmission side, especially
with respect to the user interface of a mobile phone, how
to achieve downward compatibility with older mobile
phones on the reception side, especially if special
20   characters are used in a text message to define specific
haptic effects which are not available at said mobile
phone and thus irritate the user, and how to ensure that
all features of future mobile phones that are developed
by different manufacturers are covered by such a
25   standard. Lack of standardisation so far has blocked the
introduction of haptic messaging.

Summary of the invention

Setting out from the above-mentioned problems encountered
30   in the application field of haptic messaging, it is thus
the general object of the invention to provide a device
and method for perceivably accentuating message elements
of a message without requiring any standardisation of
perceivably accentuated messaging.

The object of the invention is solved by proposing a
device for perceivably accentuating message elements of a
message, wherein said message is composed of message
5   elements chosen from a limited set of message elements,
the device comprising: means for defining and/or altering
a set of Selected Message Elements (SMEs) containing at
least one SME, wherein each SME is a message element from
said limited set of message elements; means for assigning
10   a Perceivable Accentuation Signal (PAS) from a set of
PASs to each of said SMEs in said set of SMEs; means for
searching said message for SMEs of said set of SMEs; and
means for generating the assigned PAS for each SME found
in said message. With the help of the device according to
15   the present invention, which may for instance be a part
of a mobile phone device and/or any device that can be
controlled with SMS commands , wherein both devices are
capable of rendering an SMS message that consists of
message elements (e.g. characters) of a limited set of
20   message elements (e.g. the ASCII alphabet), a user thus
has the possibility to define a set of SMEs, e.g. a set
of key words, and to assign each SME in said set of SMEs
a PAS, e.g. a certain sound. The same PAS may be assigned
to a plurality of SMEs. When a message is rendered, a
25   means in the device searches for the SMEs and, for each
found SME, a further means in said device generates the
PAS that has been assigned to said SME. The fact that no
standardisation of perceivably accentuated messaging is
required is reflected by the possibility of the user of
30   said device to define the set of SMEs (and the assigned
PASs) by himself or, if a set of SMEs and assigned PASs
has already been provided by the manufacturer of the
device as a proposal, to alter said set of SMEs (and the
assigned PASs). It is understood that the device then has

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to offer means for the display and manipulation of said
set of SMEs and the assigned PASs. Due to the lack of
standardisation, the composer of a message can not force
the generation of PASs by said device during the
5   rendering of his message, because he does not know the
set of SMEs that is used by the user of said device. In
general, this keeps the composed messages free of message
elements that have no meaning in the context format of
the message, but only serve as SME to cause a PAS at the
10   device according to the present invention. However, if
the composer of the message knows the type of device the
PASs are generated by, and further knows that the user of
said device did not or only insignificantly alter the set
of SMEs that has been provided in said device by the
15   manufacturer, forcing the generation of PASs by said
device during rendering of the message is possible. The
present invention thus has the potential of establishing
a device-specific or manufacturer-specific pseudo-
standard for perceivably accentuated messaging, if most
20   of the users do not or only insignificantly alter the set
of SMEs and the assigned PASs, e.g. by only adding
further SMEs and assigned PASs to a set of SMEs that was
provided by the manufacturer of said device. It should be
noted that the type of message is of minor importance for
25   the present invention, as long as message elements can be
identified in the message and used to define a set of
SMEs. It is thus possible to use the invention for text
messages such as SMS-based messages on mobile phones or
electronic messages on a computer, but also for spoken
30   messages (like news rendered on a car radio), modulated
signals, etc.. However, the complexity of the means for
defining the set of SMEs and the means for searching the
message for said SMEs then may vastly increase.

The entire functionality of defining SMEs, searching a
message for SMEs and generating the PASs is only required
at the receiver, not at the transmitter/sender. This is
considered as one of the main advantages of the present
5   invention.

The present invention has the further advantage that the
original messaging format is not modified, i.e. all
modifications refer to the device according to the
10 present invention without affecting the process of
composing and rendering the message. In the message, thus
no special characters are required to define a certain
vibration profile, so that the message written in the
original messaging format remains comprehensible even if
15 it is rendered on an apparatus that does not support
perceivably accentuated messaging. As a natural further
consequence, no changes are required at the device on
which the message is composed.

20 Integrating the device according to the present invention
into the device that renders the message requires only
minor extensions of the software and/or operating system,
so that the message can be searched and so that the set
of SMEs and assigned PASs can be defined and managed. The
25 present invention thus allows to introduce perceivably
accentuated messaging to the market with low market risk,
because only new devices are equipped with the feature of
perceivably accentuating messages without affecting or
influencing the other devices. However, offering the
30 feature of perceivably accentuating messages in their
devices may strongly differentiate manufacturers from
their competitors.

According to the device of the present invention, said
set of PASs preferrably comprises optically and/or
acoustically and/or haptically and/or olfactorily and/or
thermally and/or electrically PASs. Thus the full range

5   of perceivable effects that can be offered by an
electronic device is available, e.g. flashing of the
devices lights, changing the display colour, displaying
icons on the display, flashing key words on the display,
generating all kinds of sounds, especially the sounds

10   that are already programmed in the device to indicate
certain states of the device such as error sounds,
vibrating, generating scents, varying the temperature and
generating electric shocks of small power.

15   According to the device of the present invention, said
PASs in said set of PASs preferrably have different
signal characteristics such as amplitudes and/or
frequencies and/or durations and/or signal forms. A huge
variety of acoustically PASs can for instance be achieved

20   by varying the frequency or duration of a standard sine
tone.

According to the device of the present invention, it is
preferred that said message is a text message, that said

25   message elements are characters or combinations thereof
and that said means for searching said message for SMEs
of said set of SMEs comprises a parser. In a text
message, said SMEs thus may represent single characters
like exclamation or question marks, or words, or

30   combination of words or even whole sentences. The
definition of PASs for SMEs of a text message is most
intuitive and easy to achieve.

According to the device of the present invention, it is
advantageous that said set of SMEs and information on the
PASs assigned to each SME in said set of SMEs are stored
in said device. Efficient storage of the set of SMEs and
5   the assigned PASs might be accomplished by a tabular,
where the first column contains the SMEs and the second
column contains the PAS assigned to each SME. Entries in
the tabular may be grouped according to criteria related
to the SMEs (topics like "love", "fun", "work", etc.) or
10   PASs ("vibrating", "sound", "light"). Said tabular is
preferably stored in a RAM of the device or, if transfer
to other devices is desired, on a storage medium that can
be removed from the device, such as a flash card or the
Subscriber Identity Module (SIM) card of a mobile phone.
15   Naturally, for the purpose of tabular transfer to another
device any available means can be used, e.g. a Bluetooth
connection, an infrared link, a cable connection, etc.

According to the device of the present invention, it is
20   preferred that said means for generating the assigned PAS
for each SME found in said message comprises means for
generating said assigned PASs for each SME found in the
message sequentially and synchronised with the rendering
velocity of the message and/or synchronised with the
25   message perception velocity of the user of said device.
The PASs should be perceived by the user of the device in
the instant when the SMEs it is assigned to is presented
to or perceived by the user, where the message may either
be rendered by said device or by a different device (then
30   both devices are most likely integrated in one
apparatus). This, as a basis, requires that the PASs are
generated in the sequence the SMEs they are assigned to
appear in the message. Furthermore, when the means for
searching the message for SMEs has processed the message,

it may be imagined that each PAS that has to be
generated, because the SME it has been assigned to was
found in the message, is assigned a certain delay that
depends on the position of the SME in the message, so
5   that its generation is synchronised with the perception
of the corresponding SME in the message by the user. To
determine the required delay, said means in said device
requires information on the perception velocity of the
user, which may be entered manually by the user of the
10   device or the manufacturer.

According to the device of the present invention, said
device further advantageously comprises means for
determining the message perception velocity of the user
15   of said device. By measuring the time a user requires to
perceive a message and comparing it with the number of
message elements in said message, said device may for
instance determine an average message perception velocity
of said user. Average message perception velocities may
20   be determined from information that is made available by
the device that renders the message, which may either be
the device according to the present invention or a
different device, and may comprise the perception time
per message and the number of characters or words per
25   message.

According to the device of the present invention, said
device is preferably contained in a mobile phone that is
operable in a mobile communications system and said
30   message is preferably a message in the format of the
Short Message Service (SMS). Each device that is capable
of receiving SMS messages or to be controlled by SMS
messages is understood as a mobile phone in this context.

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According to the device of the present invention, said
device further preferably is contained in a computer and
said message is preferably an electronic mail (e-mail)
message.

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The object of the invention is further solved by
proposing a method for the perceivable accentuation of
message elements of a message, wherein said message is
composed of message elements chosen from a limited set of

10   message elements, comprising the following steps:
defining and/or altering a set of Selected Message
Elements (SMEs) containing at least one SEM, wherein each
SME is a message element from said limited set of message
elements and is assigned a Perceivable Accentuation

15   Signal (PAS) from a set of PASs; searching said message
for SMEs of said set of SMEs, and generating the assigned
PAS for each SME found in the message. The step of
defining a set of SMEs may be performed by the
manufacturer of the device the method is used on or by

20   the user of the method, whereas the step of altering said
set of SMEs is preferably performed by the user of said
method.

According to the method of the present invention, it is
25   preferred that said set of PASs comprises optically
and/or acoustically and/or haptically and/or olfactorily
and/or thermally and/or electrically PASs.

According to the method of the present invention, it is
30   preferred that said PASs in said set of PASs have
different signal characteristics such as amplitudes
and/or frequencies and/or durations and/or signal forms.

According to the method of the present invention, it is preferred that said message is a text message, that said message elements are characters or combinations thereof and that said step of searching said message for SMEs of

5   said set of SMEs comprises the step of parsing said message.

According to the method of the present invention, it is preferred that said set of SMEs and information on the

10 PASs assigned to each SME in said set of SMEs are stored.

According to the method of the present invention, it is preferred that said assigned PASs for each SME found in the message are generated sequentially and synchronised

15 with the rendering velocity of the message and/or synchronised with the message perception velocity of the user of said method.

According to the method of the present invention, it is

20 preferred that the method further comprises the step of determining the message perception velocity of the user of said method.

The object of the invention is further solved by a

25 computer program product directly loadable into the internal memory of a digital computer, comprising software code portions for performing the above-mentioned method steps when said product is run on a computer. The digital computer may for instance be the processor that

30 runs the operating system of a mobile phone or computer.

Brief description of the drawings
These and other aspects of the invention will be apparent
from and elucidated with reference to the embodiments
described hereinafter. In the figures show:

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Fig. 1:   A schematic block diagram of a device for
           perceivably accentuating message elements of
           a message according to the present invention.

10   Detailed description of the invention
     Fig. 1 depicts a schematic block diagram of a device for
     perceivably accentuating message elements of a message
     according to the present invention. The device comprises
     a central processor 1 that is capable of controlling all
15   functionality related to the management and generation of
     Perceivable Accentuation Signals (PASs). The device
     further comprises functionality to render messages. The
     device in Fig. 1 thus may be imagined to be contained in
     a mobile phone, where SMS messages can be rendered and
20   perceivably accentuated, e.g. the Nokia 6800 mobile
     phone, which has a colour screen and MMS capability. When
     the phone is flipped open, a full keyboard for writing
     text messages and emails quickly and easily is available.
     If the present invention targets at haptic messaging, the
25   device of the present invention can be imagined as
     "haptic effect receiver", which can easily be integrated
     into mobile phones like the Nokia 6800.

     The device receives input from a keypad 2 via a keypad
30   controller 3, from a ROM 4 via a ROM controller 5, from a
     demodulator 6, and controls a display 7 via a display
     controller 8, a speaker 9 via an audio controller 10, a
     vibration motor 11 via a vibration controller 12 and a
     light 13 via a light controller 14. The central processor

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1 further is connected to a RAM controller 15 that allows
to read data in and write data out of a RAM 16. Finally,
the central processor can input data into a parser 17 and
receive the output signals of that parser 17. The flash-
5   type of memory technology that can be reprogrammed
electronically but that otherwise operates as a typical
ROM memory can be considered in this description to be
synonymous and to serve the very same purpose without
separate notice.
10

In order to allow the perceivable accentuation of
elements of an SMS message received and rendered on the
mobile phone, the user of the mobile phone first has to
define a set of Selected Message Elements (SMEs) and to
15   assign each SME a PAS that can be generated by the mobile
phone. In this example, where the message is an SMS text
message whose message elements (characters) are taken
from the limited ASCII alphabet with 128 characters, the
SMEs are simply characters or combinations of characters.
20   The PASs that can be generated on the mobile phone are
stored in ROM 4, for instance in the following manner:

CONTENTS OF ROM 4
     PAS1:   sound, low
25   PAS2:   sound, high
     PAS3:   vibration, short
     PAS4:   vibration, long
     PAS5:   light, flashing 3 times
     PAS6:   light, static, short duration
30   PAS7:   light, static, long duration
     PAS8:   display background, flashing 3 times
     PAS9:   display background, static

The step of defining the set of SMEs and assigning each
SME a PAS is controlled by the central processor 1. By
pressing buttons on the keypad 2 and following the
instructions presented on the display 7, the user is
5   guided through a menu that allows him to enter SMEs and
to assign each SME a PAS. For each entered SME, the
available PASs as contained in the ROM 4 are presented on
the display 7 so that the user can select one PAS by
using number buttons or arrow buttons on the keypad 2.
10   After the user has confirmed his inputs, each SME of the
set of SMEs and its assigned PASs is stored by the
central processor 1 in a SME-PAS section of the RAM 16
via the RAM controller 15. The set of SMEs with assigned
PASs may for instance look like:

15

CONTENT OF SME-PAS SECTION OF RAM 16

SME1:	: (	causes	PAS1
SME2:	:)	causes	PAS2
SME3:	!	causes	PAS4
SME4:	?	causes	PAS5
SME5:	Heli	causes	PAS8

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The mobile phone is then ready to render SMS messages and
to accentuate the SMEs with PAS as defined in the SME-PAS
25   section of RAM 16. Various other ways to present similar
assignments could be made, such as a graphical
association of SMA and PAS, e.g. with icons or flow chart
type graphical presentations.

30   A standard SMS message now can be composed on an
arbitrary mobile phone or computer and sent to the mobile
phone that contains a device as depicted in Fig.1. The
composer of the SMS is not aware that the text of his SMS
is parsed on the receiving mobile phone. When the SMS is

received by the mobile phone that contains the device of
Fig. 1, the demodulator 6 forwards the message that has
been received as an RF signal via an antenna and
accordingly filtered, down-converted, demodulated and
5   decoded to retrieve the original message format
(functionality that has been completely combined into the
demodulator 6), to the central processor 1, that may for
instance store the SMS in an SMS section in RAM 16. The
text body of the stored SMS message may look like:

10

CONTENT OF SMS SECTION OF RAM 16
Congratulations !
Feeling old now ? :)
Missing you, Heli

15

When the user wants to read the SMS message, the central
processor 1 reads out the SMS data from the SMS section
of RAM 16 and the set of SMEs and the assigned PASs from
the SME-PAS section of RAM 16 via the RAM controller 15
20   and inputs this data into the parser 17. The parser 17
searches the SMS message for the SMEs and internally
generates a list that may look like:

LIST INTERNALLY GENERATED BY PARSER 17
25   SME3   found after 16 characters
SME4   found after 34 characters
SME2   found after 36 characters
SME5   found after 52 characters

30   Based on statistic information on how long the reading of
SMS messages takes the user of the mobile phone, which is
determined by the central processor 1 for each SMS read
by the user, and on the set of SMEs and assigned PASs,
the parser 17 translates the internally generated list

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into a list that is output to the central processor 1.
This list may look like:

LIST OUTPUT BY THE PARSER 17

5   Generate   PAS4 after 1.6 s
        Generate   PAS5 after 3.4 s
        Generate   PAS2 after 3.6 s
        Generate   PAS8 after 5.4 s

10   The central processor 1 now uses the display processor 8
        to present the user the SMS message on display 7 and uses
        the commands as output by parser 17 to generate the
        required PAS synchronised with the visual perception of
        the SMS by the user via the display 7. In particular, the
15   central processor 1 triggers the vibration controller 12
        to generate a long vibration 1.6 s after the beginning of
        the presentation of the SMS on the display 7, triggers
        the light controller 14 to flash the light 13 three times
        after 3.4 s, triggers the sound controller 10 to generate
20   a high sound with speaker 10 after 3.6 s and triggers the
        display controller 8 to flash the background of the
        display 7 three times after 5.4 s. The SMEs in the SMS
        message thus have been perceivably accentuated. If there
        is a need to use multiple display pages to present a
25   message, the delay function can be adjusted to take this
        into account, so that the fundamental meaning of the
        proper effect timing is sustained.

        The invention has been described above by means of a
30   preferred embodiment. It should be noted that there are
        alternative ways and variations which are obvious to a
        skilled person in the art and can be implemented without
        deviating from the scope and spirit of the appended
        claims, e.g. the storage format and storage locations of

the SMEs and PASs might substantially differ from the
set-up of the device as depicted in Fig. 1, further types
of PASs might be used and, in the field of cellular
mobile communications, the invention may be adapted to
5   the messaging format of the Enhanced Messaging Service
(EMS) and the Multimedia Messaging Service (MMS).